

## REMARKS

The Examiner is thanked for his careful and very thorough Office Action.

Claims 1-6, 8-10, 12-16, and 21 are allowed. Claims 7 and 17-20 have been rejected.

### Art Rejections

The art rejections are all respectfully traversed.

### *Review of the References*

Some of the major technical differences between the references applied and the disclosure of the present application will now be reviewed. Of course, these points in the specification do not define the scope or interpretation of any of the claims; they are listed merely to help appreciate the importance of the claim distinctions that will be reviewed thereafter.

*Dublin, Jr.* (U.S. Patent No. 6,068,394) and *Zaleski, Jr. et al.* (U.S. Patent No. 5,813,480) both teach instrumented bits. *Dublin, Jr.* has nothing to do with detecting bit failure. Neither reference appears to have anything to do with detecting changes in relative strain values.

If the undersigned attorney has overlooked a relevant teaching in any of the references, the Examiner is requested to point out very specifically where such teaching may be found.

### *Rejections Under 35 USC 102(b)*

Claims 17-20 stand rejected under 35 USC Section 102(b) as anticipated by *Dublin, Jr.*

The claim language of amended Claim 17 is not met. Specifically, amended Claim 17 recites "taking multiple strain measurements from an instrumented sub assembly which is separate from the drill bit; and deriving information regarding bit wear from relations between said respective measurements".

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Although *Dublin, Jr.* does measure the strain at each diaphragm using a strain gauge, it does not disclose or suggest a circuitry for calculating the relations between the respective measurements. This reference is directed at drilling efficiency, not at determining the actual condition of the drill bit. Therefore, the relative changes in strain between the sensors are not even considered, much less calculated, by this reference, and bit wear is not determined.

According to the Federal Circuit:

For a prior art reference to anticipate a claim, the reference must disclose each and every element of the claim with sufficient clarity to prove its existence in the prior art.<sup>1</sup>

Therefore, a prima facie case of anticipation has not been established by the Examiner with regard to this claim.

Claim 18 also recites features not shown or suggested by *Dublin, Jr.* Specifically, Claim 18 recites "taking multiple strain measurements from an instrumented sub assembly, wherein said instrumented sub assembly does not electrically communicate with said drill bit; and deriving information regarding bit wear from relations between said respective measurements."

Again, *Dublin, Jr.* does measure the strain at each diaphragm using a strain gauge. It does not disclose or suggest a circuitry for calculating the relations between the respective measurements. This reference is directed at drilling efficiency, not at determining the actual condition of the drill bit. Therefore, the relative changes in strain between the sensors are not even considered, much less calculated, by this reference, and bit wear is not determined.

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<sup>1</sup> *Motorola, Inc. v. Interdigital Tech. Corp.*, 43 USPQ 2d 1481, 1490 (Fed. Cir. 1997).

Therefore, a prima facie case of anticipation has not been established by the Examiner with regard to this claim.

Claim 19 also recites features not shown or suggested by *Dublin, Jr.* Specifically, Claim 19 recites "analyzing the relative strain induced on different parts of a bottom hole assembly during drilling; predicting drill bit failure based on said relative strain".

As stated earlier, *Dublin, Jr.* does not disclose or suggest a circuitry for calculating relative changes in strain between the sensors. This reference is directed at drilling efficiency, not at determining the actual condition of the drill bit. Therefore, the relative changes in strain among the sensors are not even considered, much less calculated, by this reference. Also, this reference does not suggest, much less teach, predicting drill bit failure. Therefore, a prima facie case of anticipation has not been established by the Examiner with regard to this claim.

Finally, dependent Claim 20 depends directly from independent Claim 19 and incorporates all the limitations thereof.

Thus, for this reason, and for the reasons discussed above, Applicant respectfully requests withdrawal of this rejection.

Claims 7 and 17 stand rejected under 35 USC Section 102(b) as anticipated by *Zaleski, Jr. et al.*

Amended Claim 7 recites features not shown or suggested by *Zaleski, Jr. et al.* Specifically, Claim 7 now recites "a plurality of sensors on the lower end of a drill string separate from the drill bit, each of said sensors connected to detect relative change in axial strain at a particular location; wherein bit failure is indicated when said relative change in axial strain exceeds a predetermined test".

*Zaleski et al.* does not disclose or suggest a circuitry for detecting relative changes in axial strain at a particular location. This reference is

concerned only with the dynamic strain at each sensor. *Zaleski et al.* simply compares the amplitudes of the data signals to pre-established thresholds. It does not consider relative changes in axial strain at a particular location. Therefore, a prima facie case of anticipation has not been established by the Examiner with regard to this claim.

Amended Claim 17 also recites features not shown or suggested by *Zaleski, Jr. et al.* Specifically, Claim 17 now recites "taking multiple strain measurements from an instrumented sub assembly which is separate from the drill bit; and deriving information regarding bit wear from relations between said respective measurements".

Again, *Zaleski et al.* does not disclose or suggest a circuitry for calculating relative changes in strain between the sensors. This reference is concerned only with the dynamic strain at each sensor. *Zaleski et al.* simply compares the amplitudes of the data signals to pre-established thresholds. It does not consider relative changes in strain between the sensors in predicting bit failure. Therefore, a prima facie case of anticipation has not been established by the Examiner with regard to this claim.

The Examiner has suggested that Claims 7 and 17 do not prevent the drill bit of *Zaleski et al.* from being considered as a part of the "drill string" or "instrumented sub assembly". Although the abstract, paragraphs [0103] and [0105], and Figures 1, 2, 6, 16, 32, and 47 are just a few examples of how the present application discloses a sub assembly that is separate from the drill bit, Claims 7 and 17 have been amended nonetheless to stress this point further.

The Examiner has noted correctly that a preamble and/or intended use is given no patentable weight. However, Claims 7 and 17 do not include an intended use. Claim 7 includes the term "wherein" which does not designate an intended use.

Accordingly, Applicant respectfully requests withdrawal of this rejection.

Conclusion

Thus, all grounds of rejection and/or objection are traversed or accommodated, and favorable reconsideration and allowance are respectfully requested. The Examiner is requested to telephone the undersigned attorney or Robert Groover for an interview to resolve any remaining issues.

Respectfully submitted,



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